

# UNITED STATES ARMY MEDICAL RESEARCH INSTITUTE OF INFECTIOUS DISEASES

USAMRIID - PROTECT, PROJECT, SUSTAIN

# **USAMRIID Overview**

for the

# Frederick County Containment Laboratory Community Advisory Committee



Colonel John P. Skvorak, DVM, Ph.D. Commander www.usamriid.army.mil







# **USAMRIID History**

#### USAMRIID - PROTECT, PROJECT, SUSTAIN

- First US biowarfare facility was started in April 1943 at Camp Detrick in quickly built facilities and in Air National Guard buildings that were adapted for use.
- The US Army Medical Unit (USAMU) was created in 1956 to develop the means to diagnose, treat, and prevent diseases caused by biological warfare agents.
- President Nixon ended the Biowarfare R&D Program in 1969 but allowed continued development of medical countermeasures.



USAMU was renamed USAMRIID, 27 January 1969.





#### Chain of Command

USAMRIID - PROTECT, PROJECT, SUSTAIN

# U.S. Army Medical Command LTG Eric Schoomaker US Army Surgeon General



# U.S. Army Medical Research and Materiel Command

MG James Gilman

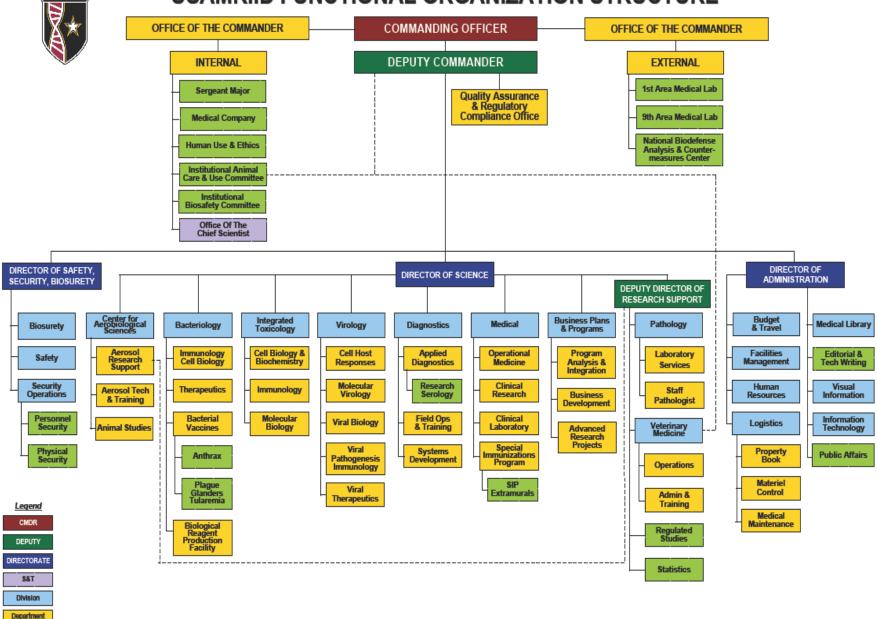


**USAMRIID** 

COL John P. Skvorak



#### **USAMRIID FUNCTIONAL ORGANIZATION STRUCTURE**



Branch



# **USAMRIID Mission and Vision**

USAMRIID - PROTECT, PROJECT, SUSTAIN

We conduct research on current and emerging biodefense threats, resulting in medical solutions to protect the Warfighter.

Be the Nation's pre-eminent research laboratory for medical biological defense, providing innovative solutions to protect the Warfighter.





# First Things First

USAMRIID - PROTECT, PROJECT, SUSTAIN

#### What we do:

Develop and test vaccines, drugs and diagnostic tests to protect against known biological threats

Publish and present our research findings

Educate and train medical personnel

Provide expert consultation and assistance on emerging diseases and other issues

#### Who we are:

About 850 civilians and military personnel, with jobs ranging from administration to research

Most of us live in Frederick County

#### What we don't do:

Conduct classified research

Conduct offensive research

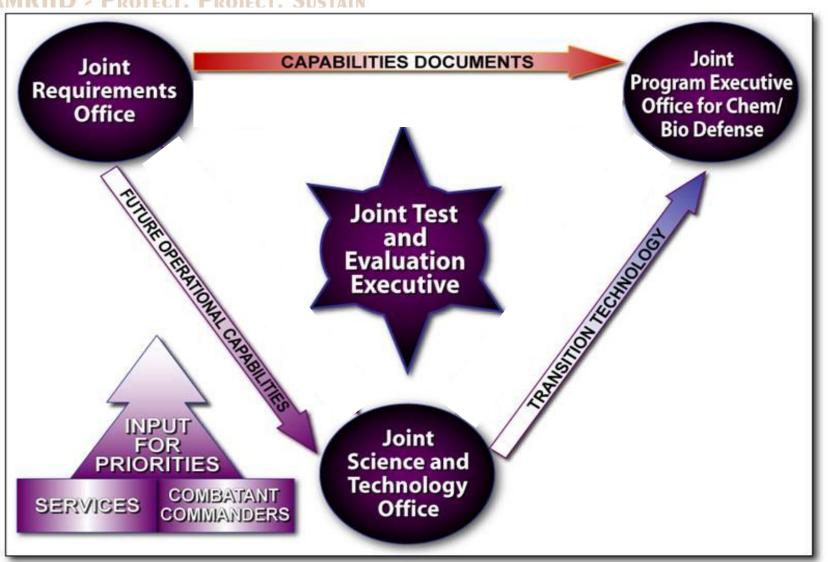
Develop new biological threats





# DoD Chem/Bio Defense Program Organization

USAMRIID - PROTECT. PROIECT. SUSTAIN





# Convergence of Military & Civilian Biodefense Requirements Post-9/11

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## PARTNERSHIPS



Biosecurity
Requirements
UNIQUE
to the
Military

Biosecurity
Requirements
SHARED
by the Military
and the Nation

Biosecurity
Requirements
UNIQUE
to the
Nation



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DoD & DHIHS





# Biological Agents in USAMRIID Research

#### USAMRIID - PROTECT, PROJECT, SUSTAIN

#### **Category A**

Bacillus anthracis (Anthrax)

Clostridium botulinum (Botulism)

Yersinia pestis (Plague)

Variola major (Smallpox\*) & other

pox viruses

Francisella tularensis (Tularemia)

Lassa Fever Virus

South American Hemorrhagic

**Fever Viruses** 

Hantaviruses

Rift Valley Fever

**Ebola Virus** 

Marburg Virus

#### **Category B**

Coxiella burnetti (Q fever)
Burkholderia pseudomallei
Burkholderia mallei (Glanders)
Brucella species (Brucellosis)
Ricin toxin
Staphylococcus enterotoxin B
VEE, WEE, EEE (Equine
Encephalitis Viruses)

#### **Category C**

Crimean-Congo Hemorrhagic Fever Virus

Yellow Fever Influenza

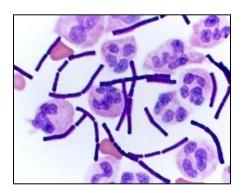


<sup>\*</sup> Only at the CDC Lab in Atlanta

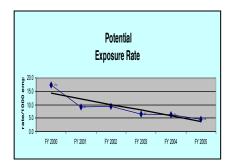


# USAMRIID's Critical Core Competencies

#### USAMRIID - PROTECT, PROJECT, SUSTAIN



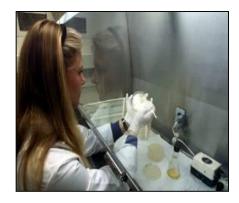
**Bio Agents** 



Safety, Security, Surety



**Biocontainment Laboratories** 



**Subject Matter Expertise** 



**Animal Care and Use** 



**Aerobiology** 





# **USAMRIID's Unique Facilities**

#### USAMRIID - PROTECT, PROJECT, SUSTAIN









- •Biosafety level (BSL)-4 -- 8,400 gsf (9,600 after renovation complete)
  - 3 suites, 11 laboratory rooms
- •BSL-3 -- 41,800 (gsf)
  - 14 suites, 108 laboratory rooms
- BSL-2 -- 53,700 gsf
  - 96 laboratory rooms
- Animal care facility
  - 75 rooms in BSL-2,3,4
- Center for Aerobiology
  - 9 Class 3 biosafety cabinets (BSC) (7 BSL-3, 2 BSL-4)
- Field laboratory training center



## **USAMRIID Science**

#### USAMRIID - PROTECT, PROJECT, SUSTAIN

#### **Program Overview**

- Pretreatments
  - ✓ Vaccines for bacterial, toxin, and viral agents with the current focus on Burkholderia, ricin, and Filoviruses
  - ✓ Multi-agent vaccines
- Therapeutics for bacterial, toxin, and viral agents
  - ✓ Current focus on plague, Burkholderia, botulinum, and Filoviruses
  - ✓ Special interest in broad spectrum
    - Focus on hemorrhagic fever viruses and intracellular bacterial pathogens
    - Looking for common disease causing or host response pathways
- Diagnostic technologies
  - ✓ Current focus on assay development for existing platforms, assay standardization, evaluation of next generation diagnostic capabilities
- Animal Models
  - ✓ Safety
  - ✓ Evaluate efficacy of vaccines and therapies following infection
    - Vaccine protects from disease
    - Therapeutic enables recovery
    - **Best delivery method**
  - ✓ Efficacy/mode of exposure to pathogen





# USAMRIID's Current Operational Model

#### USAMRIID - PROTECT, PROJECT, SUSTAIN

#### **Leverage From External Sources**

(selected examples)

#### **Product Candidates**

- Antisense Oligos (ex. AVI Biopharma, Tekmira)
- Novel antimicrobials (ex.Novartis, Siga, Combinatorx)
- Vaccine candidates (ex.AlphaVax, NIAID VRC)

#### **Technologies**

- Diagnostic systems (ex. BioVeris, Idaho Technologies)
- Antibodies (ex. VaxDesign, BioFactura, Abgenix)
- Vaccine delivery devices (ex. Pfizer, Ichor, Inovio, B-D)
- Vaccine vectors (ex. RML, Vical, Crucell)
- Adjuvants (ex. Pfizer, Novartis)

#### **Concepts & Capabilities**

- DNA vaccination
- siRNA
- Reverse genetics (ex. LANL, Columbia U., NMRC)
- Host targets for viral assembly (ex. Prosetta)
- Bioinformatics (ex. JCVI, VBI, LANL, BHSAI)
- Transgenic Mice (ex. Lexicon Genetics, Jackson Labs)

#### ~650 active agreements



#### **USAMRIID**

- Pathogenesis studies
- Adaptation of technology to biodefense countermeasures
- Animal model development
- Evaluation of countermeasure



#### **Provide to Customers**

- Product candidates
- Technical information

We apply cutting-edge approaches to our problem sets!



# Major Partnerships/Collaborations

#### **Academia**

Arizona State University

**Baylor College of Medicine** 

**Duke University** 

Frederick Community College

George Mason University

**Hood College** 

James Madison University

Johns Hopkins University

Johns Hopkins University School of Medicine

Johns Hopkins University School of Public Health

Mount Sinai School of Medicine

Ohio University

Oklahoma Medical Research Program

**Purdue University** 

Rutgers - The State University

Stanford University

Thomas Jefferson Medical School

Trudeau Institute

**Tufts University** 

Tulane School of Public Health and Tropical Medicine

Tulane University Health Sciences Center

University of Alabama

University of Arkansas

University of California at San Francisco

University of California, Santa Barbara

University of Georgia Research Foundation

University of Maryland

University of Massachusetts Medical School

University of Michigan

University of North Carolina - Chapel Hill

University of Pennsylvania

University of Pittsburgh

University of Texas Medical Branch

University of Utah

University of Virginia

University of Wyoming

Virginia Tech / Virginia Bioinformatics Institute

Washington University

#### Industry

Abgenix, Inc.

Akonni Biosystems, Inc.

Akubio Limited/T.R.U.E. (Grant)

Aldevron, LLC

Allergan, Inc.

Alnylam Pharmaceuticals

Alpha Gamma Technologies,

AlphaVax Human Vaccines.

AOAC, International

AVI BioPharma Inc.

Becton, Dickinson & Company

BioFactura. Inc.

**BioReliance Corporation** 

BioSante Pharmaceuticals

**BioVeris Corporation** 

Callisto Pharmaceuticals, Inc.

Cepheid. Inc.

Chimerix Inc./TRUE

Chiron Corporation

CombiMatrix Corporation

CombinatoRx, Inc.

CreatV MicroTech. Inc.

**CUBRC** and Prosetta

Corporation

Cyto Pulse Sciences, Inc.

Diversa Corporation

DOR BioPharma. Inc.

DynPortVaccine Company, LLC

EluSvs Therapeutics. Inc.

**Functional Genetics** 

GenPhar, Inc.

Gilead Sciences. Inc.

Goodwin Biotechnology, Inc. GTC Biotherapeutics, Inc.

**ID Biomedical Corporation** 

IGEN International, Inc.

Imigene, Inc.

Innovative Biosensors, Inc.

Inovio Biomedical

Integrated Biotherapeutics Integrated Nano-Technologies

**Invitrogen Corporation** 

Isis Pharmaceuticals, Inc.

Kemp Biotechnologies, Inc. Large Scale Biology Corporation

Lexicon Genetics. Inc.

LigoCyte Pharmaceuticals. Inc.

Mapp Biopharmaceutical, Inc.

Maxygen, Inc.

Meso Scale Diagnostics, LLC

Microbiotix. Inc.

MicroFluidic Systems

MIDI Inc.

Morphotek, Incorporated

NanoVec

National Food Research Institute

Northrop Grumman Systems

Nuvelo, Inc.

Oncovir. Inc.

Ordway Research Institute

Orion Integrated Biosciences, Inc.

Point Therapeutics. Inc.

PowderMed Ltd.

Protiva Biotherapeutics, Inc.

Protiveris, Inc. Pulmatrix. Inc.

Qiagen

Quaestech, LLC

Roche Diagnostics Corporation

SIGA Technologies, Inc.

Southern Research Institute (SRI)

Structural Bioinformatics. Inc.

The Institute for Genomic Research

The McConnell Group

VaxDesign Corporation

VaxGen. Inc.

Vical Incorporated Virion Systems, Inc.

VivoMetrics, Inc.

#### **Government/Military**

Centers for Disease Control and

Prevention (CDC)

Central Intelligence Agency (CIA)

Defense Intelligence Agency (DIA)

Dept. of Health & Human Services

Federal Bureau of Investigation (FBI)

Food and Drug Administration

Lawrence Livermore NL

Los Alamos National Lab (LANL)

National Biodefense Analysis and

Countermeasures Center (NBACC)

National Cancer Institute (NCI)

National Institute of Allergy and

Infectious Diseases (NIAID)

National Institute of Environmental

Health Sciences (NIEHS/NIH)

National Institutes of Health (NIH) Secret Service

U.S. Department of Agriculture

U.S.Postal Service

18th MFDCOM

Armed Forces Institute of Pathology

Army Research Laboratory

JPEO-CBD/JPM-CBMS

**USAMRMC** Laboratories

USUHS

1st and 9th AML

#### International

**CBR MOU** 

Defence Science & Technology

Laboratories

PowderMed Ltd.

Public Health Agency Canada

Robert Koch Institute

University College London

University of Calgary

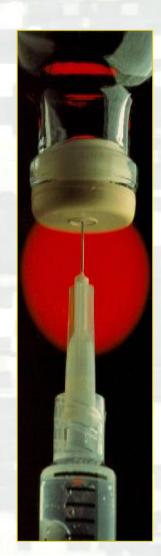
University of Freiburg

University of Glasgow

University of Marburg



# **USAMRIID Biodefense Products**



#### Available For Use Today

- Tularemia Vaccine (IND)
- Venezuelan Equine Encephalitis (VEE) Vaccines (IND)
- Eastern Equine Encephalitis (EEE) Vaccine (IND)
- Western Equine Encephalitis (WEE) Vaccine (IND)
- Botulinum Pentavalent Toxoid Vaccine (IND)
- Smallpox Vaccine (cell culture derived vaccinia virus)
- Botulinum Antitoxin (human & horse)
- Vaccinia Immune Globulin
- Ribavirin
- Joint Biological Agent Identification and Detection System (JBAIDS)
- · Anthrax Gammaphage Diagnostic
- Antibiotic Treatment of Pneumonic Plague and Inhalational Anthrax
- H5N1/H1N1 JBAIDS Influenza Diagnostic Kit (510 k/EUA)

# In Advanced Development

- rPA-Based Anthrax Vaccine
- Botulinum Neurotoxin Bivalent Vaccine
- Plague Vaccine (F1-V)
- Staphylococcal Enterotoxin B Vaccine
- Hantavirus Vaccines

# **Emerging Products**

Ricin Vaccine

Ebola/Marburg Vaccine and Therapeutics

ST-246 for Treatment of Smallpox

- 73 Diagnostic Assays Submitted to the FDA for pre-EUA review
- Botulinum Neurotoxin Heptavalent Vaccine
- Next-Generation Immunodiagnostics
- Next-Generation EEE/WEE Vaccines
- Burkholderia Vaccine and Therapeutics
- Venezuelan Equine Encephalitis Virus Vaccine

USAMRIID scientists develop at least one new medical countermeasure per year.



## **USAMRIID Biodefense Products**

#### USAMRIID - PROTECT, PROJECT, SUSTAIN

<b>Knowledge Products</b>	<b>FY10)</b>
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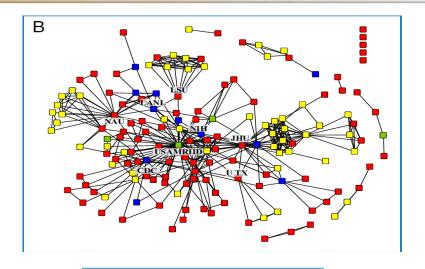
Abstracts	97
Presentations	364
Manuscripts	143
MCBC Students	341
FIBWA Students	51

#### **Intellectual Property**

Active Foreign Applications Filed	59
Active Foreign Patents Issued	25
Active US Applications Filed	39
Active US Patents Issued	72
Active License Agreements	18

#### **Agreements**

Active CRADAs	188
Active MTAs	300
Active EPAs	2
Active CTAs	10
Active Intergovernmental	151
TOTAL	651



Generated \$280K in Royalty Income in 2009

Generated \$35.5M in Reimbursable Income in 2009





# Biodefense Education & Training

#### USAMRIID - PROTECT, PROJECT, SUSTAIN

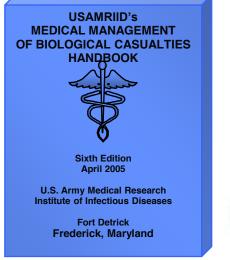
#### **Publications**

- Medical Management of Biological Casualties Handbook
- Textbook of Military Medicine: Medical Aspects of Biological Warfare (2007)
- Joint Pub (FM 8-284) Treatment of Biological Warfare Agent Casualties
- More than 35,000 educational DVD products distributed
- More than 100,000 Handbooks distributed

#### **Training Courses**

- Medical Management of Biological Casualties (MCBC)
- Field Management (FCBC)
- Hospital Management (HM-CBRNE)
- More than 120,000 students taught in resident, off-site, and Distance Learning courses
- Field Identification of Biological Warfare Threat Agents (FIBWA)

Leader in medical biological defense training & education







Ongoing

# Outbreak Investigations

USAMRII 1969	Venezuelan Equine Encephalitis (VEE), Honduras
1971	VEE in horses, Central America, southern Texas
1984	Eastern Equine Encephalitis in whooping cranes, Patuxent Wildlife Preserve, MD
1977	Rift Valley fever (RVF), animals and humans, Egypt
1983	Chikungunya fever, Indonesia
1988	Infant botulism, San Francisco
1988	RVF in animals and humans, Senegal and Mauritania
1989	Simian hemorrhagic fever, New Mexico
1990	Reston Ebola virus outbreak in primate colony, Reston, Virginia
1993	Hantavirus outbreaks in United States
1993	RVF outbreak in Egypt
1995	Ebola outbreak in Zaire
1995	VEE in Colombia
1996	Ebola Reston virus NHP outbreak, Alice, Texas
1997	Ebola Ivory Coast
1999	West Nile Virus
2000	West Nile Virus
2000	Anthrax outbreak, Minnesota
2000	Potential Ebola virus case, Uganda
2001	Support for Florida, New York City, and Washington, DC Anthrax cases
2003	SARS, 8 confirmed U.S. cases, CA, NJ, NM, NC, PA, UT, VA
2003	Monkeypox, Indiana, Illinois, Wisconsin
2003	Malaria Outbreak among Marines in Liberia
2006	Plague, Colorado
2006	Chikungunya fever, La Réunion, Mayotte, Maurice, Seychelles and India
2007	Burkholderia, Australia
2007	RVF outbreak in Kenya
2007	Tularemia in Thailand
Ongoing	Monkeypox in Democratic Republic of the Congo

Lassa fever in Sierra Leone







## **USAMRIID's Existing Facilities**

#### USAMRIID - PROTECT, PROJECT, SUSTAIN

Built in 1950s and 1960s for 325 personnel

Combined size of ~ 500,000 gsf (in 18 buildings)

Currently house ~ 850 personnel

Major utilities and support systems cannot readily accept new technologies

Maintenance consumes an increasingly greater amount of USAMRIID's operating budget







## Description of the New USAMRIID

#### USAMRIID - PROTECT, PROJECT, SUSTAIN

Estimated Size: ~ 810,000 gsf

Cost: \$683M

Staff: ~ 950

Estimated Operation: 2015

Purpose:

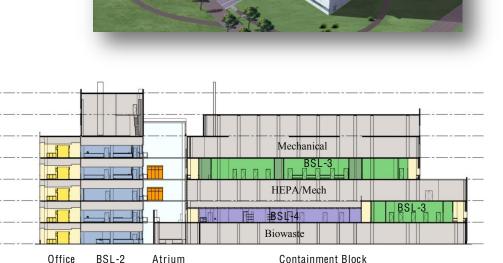
✓ Expand laboratory capacity

✓ Expand animal space

✓ Expand administrative

#### area

✓ Incorporate new capabilities



✓ Flexible design to allow incorporation of future technologies





# National Interagency Biodefense Campus (NIBC)

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USAMRID.

Usamus Army

United States Army Medical Research Institute of Infectious Diseases

Biodefense solutions to protect our nation

World Class Staff

Important Mission for the DoD and Nation

Outstanding Record of Safety, Compliance, and Security

Partnering for Success

Developing the Next Generation of Leaders

